[0038] the sensor pad, having a size in the second direction substantially similar to the width of the fluidic channel and having a size in the third direction substantially similar to the depth of the fluidic channel, comprising a molecularly imprinted polymer or an antigen or antibodies which bind the drug and the conjugate.

[0039] In another aspect, the invention provides a method for flow control of a fluid, comprising:

[0040] guiding, by a structure a flow of a fluid comprising a drug, the structure comprising a fluidic channel having a width in a second direction perpendicular to the first direction and a depth in a third direction perpendicular to the first direction and the second direction, the fluidic channel comprising a non-porous material and three non-concatenated channel portions segregated along the first direction by a reagent pad followed by a sensor pad in respect to the first direction, the sensor pad separated from the reagent pad by a channel portion, and having a absorption pad interfacing with a channel portion following the reagent pad, the sensor pad and the two channel portions along the first direction and not interfaced with the reagent pad or the sensor pad, the absorption pad comprising a fluid absorbing material;

[0041] releasing a conjugate of a drug and label from the reagent pad into the fluid as a result of the reagent pad having a size in the second direction substantially similar to the width of the fluidic channel and having a size in the third direction substantially similar to the depth of the fluidic channel and the reagent pad comprising a conjugate which is soluble in the fluid; and

[0042] bonding drug and conjugate from the fluid to the sensor pad as a result of the sensor pad having a size in the second direction substantially similar to the width of the fluidic channel and having a size in the third direction substantially similar to the depth of the fluidic channel and the sensor pad comprising a molecularly imprinted polymer, an antigen or an antibody which binds the drug and the conjugate.

Detailed Description of the Invention

BRIEF DESCRIPTION OF THE DRAWINGS

[0043] The invention will be more clearly understood from the following description of some embodiments thereof, given by way of example only with reference to the accompanying drawings in which:

[0044] FIG. **1** is a perspective view of an analysis system, showing how it is carried and used at a general level in one embodiment;

[0045] FIG. **2** is an exploded view showing individual components of a sampling cartridge of the analysis system, and FIG. **3** is a set of three perspective views of the cartridge;

[0046] FIGS. **4***a* and **4***b* are front and rear views of a fluidic chip of the cartridge, the fluidic chip having a substrate with channels for guiding sample fluid into the sensor; and FIG. **4***c* shows a cross-sectional view along a channel of the fluidic chip;

[0047] FIG. **5***a* is a set of perspective and cross-sectional views showing how a swab is inserted in a cartridge, and FIGS. **5***b* to **5***h* are views of alternative arrangements for receiving swabs or other sample collection devices;

[0048] FIG. **6***a* shows the cartridge of FIG. **2** in more detail, and FIG. **6***b* shows a further arrangement of the cartridge;

[0049] FIG. **7***a* is an exploded views of the fluidic chip, and FIG. **7***b* is an exploded view showing an alternative way of manufacturing the chip;

[0050] FIGS. **8***a* to **8***g* are diagrams showing alternative fluidic chip arrangements;

[0051] FIGS. **9***a* to **9***g* are diagrams showing other fluidic chip arrangements, differing in terms of how pads are inserted in the channels;

[0052] FIGS. **10***a* to **10***f* are diagrams showing further fluidic chip arrangements, in which pads are pre-mounted on strips which are then inserted in the channels;

[0053] FIG. **11** is an exploded view of the optical detection reader of the system of FIG. **1**,

[0054] FIG. **12** shows a light detection arm of the module, and FIG. **13** features of the module that facilitate positioning and alignment of a cartridge; and

[0055] FIG. **14** is a diagram illustrating the optical detection reader in use in an electric field, not being affected by it.

DESCRIPTION OF THE EMBODIMENTS

[0056] In one aspect, an analysis system of the present invention comprises a sampling cartridge for receiving a fluid sample. In some embodiments the cartridge is adapted for receiving a swab, and for retrieving and transferring a swabbed sample of fluid, such as oral fluid, to active sensors in one or more channels. The channels may have microfluidic dimensions, for fast sampling and small sample volumes for applications such as screening for drugs of abuse. In various embodiments, each channel has a reagent pad and a sensor pad, and in various embodiments the sensor may be of the antibody, and/or antigen, and/or molecularly imprinted polymer (MIP) type. Once the sample has been inserted into the cartridge, the cartridge is inserted into an optical detection reader for sample analysis. Because there are multiple parallel channels, there is a large extent of analysis multiplexing possible, there being one analysis per channel.

[0057] It is to be understood that a variety of fluid sample types at the microfluidic volume level can be analyzed by various embodiments of the analysis systems such as for example, physiological fluid samples, food, beverages, and environmental samples. Examples of physiological fluids, include, but are not limited to, blood, serum, plasma, sweat, tears, urine, peritoneal fluid, lymph, vaginal secretion, semen, spinal fluid, ascetic fluid, saliva, sputum, breast exudates, and combinations thereof. Examples of analytes that can be detected in physiologicall fluids include, but are not restricted to, proteins, (including immunoglobulins, hormones etc.), polynucleotides, steroids, drugs and infectious disease agents (of bacterial or viral origin, eg. Influenza, Streptococcus and Chlamydia) or antibodies to infectious disease agents (eg. HIV, Rubella and Hepatitis). Examples of foods or beverages include, but are not limited to, wine, honey, soy sauce, poultry, pork, beef, fish, shellfish, and combinations thereof. Examples of environmental samples include, but are not limited to, water, environmental effluent, environmental leachates, waste water, pesticides, insecticides, waste by products, and combinations thereof.

[0058] As used herein, the term "oral fluid" describes any fluid collected from the oral cavity, e.g., by use of absorbents, or expectoration or direct collection of glandular secretions from the salivary glands. It will be appreciated that oral fluids are often complex mixtures of different secretions including glandular secretions and oral mucosal transudate. These generally contain varying concentrations of proteins (eg.